A. "The prior art made of record and not relied upon" which "is considered pertinent to applicant's disclosure" touches upon the general field of the applicant's invention but does not disclose any prior recognition or any consciously purposeful or even unwitting employment of the principle employed in the applicant's invention and thus not the applicant's invention.

B. Archimedes' Principle as described in the copied pages from Encyclopedia Britannica as well as the principles outlined in the excerpt from the seventh edition of Elementary Fluid Mechanics by Street, Watters and Vennard are quite familiar to the applicant.

C. SU 996672 (Dubrovin): Information in the furnished reference is limited and supplies little detail as to the liquid filled support column but it does to be a hydraulic device utilizing fluid pressure and it does mention valves which are designed to stabilize pressure in the column under varying temperature conditions. Lift in the applicant's support column is derived entirely from the buoyancy effect. No external pressure is supplied and valves are not required. Sealing of entry and exit apertures was suggested to prevent liquid evaporation.

D. Seely & Rodney show canal lock constructions.

Seely shows how corrugated metal can be used to save the labor and expense of setting of stone masonry in the erection of locks. He felt that his method would enable him "to widen the present locks in use at a small cost and very speedily, and thus adapt them for river gun boats, and at the same time increase their capacity for commercial purposes" This patent has no readily apparent bearing on the applicant's invention.

In the case of Rodney, while his shaped walls may coincidentally have some resemblance to the sides of some ships, there was no attempt to provide a fore and aft or front and back-side conformity for any vessel. The stated purpose of his design was "to give the water in a canal a rotary motion, thereby avoiding the excessive wash over the bank."

No conformal cavity with minimal spacing was shown or suggested and certainly not for the purpose of reducing the weight of liquid required for flotation to less than that of the floating vessel.

E. Dutton shows aqueduct construction and mentions that Figs 5 to 14, inclusive, illustrate an aqueduct that is "designed to connect a canal or other waterway with a lift lockL."

Again, there are no conformal cavities in evidence to reduce the required weight of supporting liquid to less than the weight of a floated vessel.

F. Buzzell's invention is directed to the design of cable fenders for use in a canal as a protection for the canal walls and in particular the gates of the canal. The resilient cables are controlled by mechanisms of his design. No significant bearing on the applicant's invention is evident. While Buzzell's invention is related to structures used in a canal, they appear to be canal accessories rather than canal structures.

G. Omachi shows a method of reducing water consumption in canal locks by using inflatable air chambers which can be inflated in a lock to raise a water level as an alternative to adding water. Natural-flow pumpless transfer as well as pumped air and water transfer is employed. No direct bearing on the applicant's invention is perceived.

None of the above attempt to violate any stated laws of buoyancy in their constructions.

The fact that the Examiner considers the applicant's invention to be based on "a violation of the natural law of buoyancy" does not negate the function of the invention. It does however indicate that no prior devices sought to employ it since it is considered contrary to established principles and would have been deemed unemployable and unpatentable. This position should should also eliminate any possible future contention of obviousness, should the occasion arise, regarding the prior art taken either singly or in combination.

The applicant's invention is not actually based on "a violation of the natural law of buoyancy" but merely a violation of a conventional perception. It is based on what might be considered either an extension of the stated laws, or the correction of an error of omission in the laws as stated, accepted, taught and generally understood.. This extension or correction, while generally rejected in theoretical considerations, is fully supported by physical demonstration and therefore must perforce become a part of the buoyancy laws.

While a body, immersed to a certain depth in a large container or open water receives an upward thrust equal to the weight of the displaced water, the same effect can be achieved and the same amount of buoyant force produced, when all but the immediately surrounding layer of water is replaced by substantially rigid walls of a conformal enclosure or cavity..

It is our contention that "contemporary knowledge in the art" must include the applicant's discovery and should not be rejected on the basis of violating previously stated laws, regardless of their antiquity and long standing acceptance in the scientific community.

It is suggested that the Examiner permit the applicant to provide the demonstration kit offered in the most recent petition to amend before examination.

The kit, like those which were advertised nationally in early 2000 in the Mensa Bulletin, includes an inner glass bowl weighing approximately 344 grams and an outer plastic bowl with inner contours that conform closely to the outer contours of the glass bowl. Each kit also include a plastic syringe graduated to 60 ml which is fitted with a flexible plastic tube

in place of a needle. While the syringe can be used for general measuring of liquid for the demonstration, it was more specifically designed for a particular demonstration in which liquid is introduced into the narrow space between the walls of the bowls after they are assembled in a dry condition. Surprisingly, water weighing approximately 90 grams can easily lift and float the approximately 344 gram weight of the glass bowl when inside the conformal cavity of the plastic bowl. This has been demonstrated for the benefit of the undersigned attorney as well as many others who can attest to its validity. Unfortunately the applicant is an independent inventor and not associated with a university or other large scientific body which can readily provide an authoritative confirmation of the principle's validity. However, if an Examiner's personal assessment of a demonstration is deemed insufficient, or that of the supervisor David Bagnell, demonstration kit materials can be provided for the testing convenience of whomever you choose, or demonstrations can be personally made for the assessment of any designated locally or regionally accessible persons of respected judgment.

Respectfully submitted,

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Docket D-7211(1156)

BUOYANCY DEVICES USING CONFORMAL CAVITIES

ABSTRACT

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The invention [is based on the inventor's discovery that the] provides buoyant structural support exerted by [of] an immersed [object will] body wherein the buoyant force is made to exceed the weight of the liquid [it] the body displaces when the liquid is displaced within a cavity that conforms to the horizontal shaping of the [object] body and is only slightly larger in size. The invention calls for cavities that are made to be conformal with preexisting [objects] bodies as well as for cavities and [objects] bodies made to be conformal in combination. [Such cavities can support a ship or floating platform on a relatively thin layer of water.] A vertical support column comprises an outer [tubular] element, closed at the base, with inner walls that are closely spaced from a movable, inner flotation element [of tubular shape], accessible from the top, the two being separated in use by a relatively thin layer of liquid that provides a relatively great force of buoyancy. [Because of the floating principle and hydraulic distribution of a compressive load applied to the combination, increases in length provide increased load support without the corresponding increases in diameter usually required to resist buckling.] The column is installed before addition of liquid, for convenience in handling, and may be used as an adjustable lift device by incremental additions of liquid.

CLAIMS

VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. A device for providing [buoyancy] buoyant support to [an object containing] physical structures comprising a body adapted for connection to such structures and contained within a cavity, said cavity being made to contain a liquid and to have walls that generally conform horizontally in their shaping to the shape of [an object] the body to be received and immersed in the liquid, said cavity also being made of a size that causes [such] the conformal walls to have a relatively close spacing to the side surfaces of [said object] the body so that [a] the contained liquid may exert an upward buoyant force on the immersed [object] body that is greater than the weight of the liquid that [it] the body displaces and generally equal to [a] the volume of the liquid that has the same volume as the [object] body or that portion of the [object] body that is immersed so that the total weight of the device may be reduced by reduction of required liquid without reduction of buoyant force.[.]

2. The device as defined in claim 1, in which the [entire] base of the cavity is also made to conform substantially to the [shape] base of the [object] body or portion of the [object] body to be immersed and made of a size that [causes] will permit the cavity to have a relatively close spacing to both the sides and the base of the [object] body so that a maximum buoyant force may be achieved with the least requirement of liquid support.

3. The device as defined in claim 1, in which the cavity and the [object] body are [specifically made for each other,] both [being] made with [vertical] vertically extended walls of substantially uniform lateral dimensions to permit a substantially uniform horizontal spacing that is maintained at differing levels of [object] body immersion.

4. The device as defined in claim 1, in which the cavity and the [object] body are [specifically made for each other, both being] made [with] to include sloping walls that [cause the walls to] reduce their spacing as an immersed [object] body increases its displacement to increase the rate of increase in buoyant force as the body descends by increasing the rate of immersion.

5. In a device for providing buoyancy support to physical structures comprising [an object and containing] a body contained within a cavity[,] which is made to contain and confine

a liquid, the improvement comprising cavity walls that are made to generally conform horizontally in their shaping to the side shaping of [an object] the body to be received and immersed in the contained liquid, said cavity also being made of a size that causes [such] the conformally shaped walls to closely confine the space about the [object] body so that [a] the contained liquid may rise more rapidly about the [object] body, relative to its descent, and immerse it with less displacement, [yet exert] so that an upward buoyant force may be exerted upon [on] the immersed [object] body that is substantially equal to [a] the weight of the liquid that would be displaced by immersion to the same extent under relatively unconfined conditions.

6. The improvement as defined in claim 5, wherein the cavity is further made to conform to the base shaping of the [object] body as well as the side shaping of the body in order to further reduce the liquid weight and volume required to achieve the said buoyant force.

7. The improvement as defined in claim 5, wherein the cavity and the [object] body are [designed to closely fit, so that minimal spacing may be employed for liquid between them, both being] made with vertical walls having extended spans of lateral dimensional uniformity to permit a substantially uniform horizontal spacing that is maintained with differing levels of [object] body immersion.

8. The improvement as defined in claim 5, in which the cavity and the [object] body are [specifically] made [for each other, with] to include non-vertical walls that cause the walls to move closer together as the [object] body descends into the cavity so that the rate of increase in buoyancy relative to descent will be made to increase by increasing the rate of immersion.

9. The device as defined in claim 1, wherein the body to which said cavity is made to [have walls that] conform [to] is a preexisting [object] body.

10. The improvement as defined in claim 5, in which the body to which cavity walls are made to generally conform in their shaping [to the shaping of] is a preexisting [object] body.

[11. The device as defined in claim 1, in which the function of the device is to demonstrate a new principle of buoyancy.]

[12. The improvement as defined in claim 5, in which the the function of the improvement is to demonstrate a new principle of buoyancy.]

[13. The device as defined in claim 1, in which the function of the device is to visually demonstrate a new principle of buoyancy.]

[14. The improvement as defined in claim 5, in which the function of the improvement is to visually demonstrate a new principle of buoyancy.]

15. In a combination made to generate buoyant force, and to demonstrate the principles of its generation, the improved combination that permits the displacement of a volume of liquid to be less than the immersed volume of [an object] a body so that the buoyant force exerted on the body may exceed the weight of the displaced liquid, said combination comprising [an] the [immersible object] body, [a] the liquid and a cavity adapted to contain both the liquid and [object] the body, said cavity having walls made to at least partially conform to the shaping of the [immersible object] body and made to be closely spaced from the [immersible object] body when it is placed in the cavity.

16. The combination as defined in claim 15, [including a preexisting object wherein] in which the body to which the cavity walls are made to generally conform in their shaping [to the shaping of said preexisting object] is a body that is preexistent.

17. The combination as defined in claim 15, wherein both the cavity and the [immersible object] body are especially made so that their walls generally conform in shape, one to the other.

18. The combination as defined in claim 15, in which the [function of the combination is to demonstrate a new principle of buoyancy.] cavity and the body are made to include non-vertical walls that cause the walls to move closer together as the body descends into the cavity so that the rate of increase in buoyancy relative to descent will be made to increase by increasing the rate of immersion.

[19. The combination as defined in claim 15, in which the function of the combination is to visually demonstrate a new principle of buoyancy.]